State in Nigeria. The project was funded and carried out jointly by WHO and the Federal Government of Nigeria. Depth and understanding of problems relating to malaria control in an holoendemic area have been advanced markedly through the program with the broadly meaningful, dedicated collaborative efforts supported by investment of the equivalent of some $US 6 million. Bases for future field research in insect-borne parasitic diseases may well have been rendered the more firm through analysis (and appreciation) of the strategy which led to this well-integrated report. The Garki Project was developed with clear perspectives and understanding, so that objectives were specific without becoming focussed on positive observations, only. This compilation was developed with the care and balance merited it.

The Garki Project is a work in which divisions within the study have been defined to render meaningful the unit on Practical Conclusions for the Future of Malaria Control. The conclusions relate to: use of residual insecticides (as, propoxur; temephos); combination of mass drug administration (as, sulfalene-pyrimethamine) with residual insecticides; and, selective chemotherapy and prophylaxis. Those matters have been developed in chapters covering the study area, regarding: control operations; entomology; parasitology; immunology; abnormal haemoglobins and ABO blood groups; demography; clinical surveys; and, the mathematical model of transmission. Readers of *Mosquito News* will find highly pertinent the work with insecticides, the entomology of anophelines (11 species) in Northern Nigeria, and relationships between entomological and parasitological findings, and should attend the various features relating to the mathematical model of the epidemiology of malaria toward quantitative comparison (using *Fortran* or *Basic*) of the relative effects of different interventions.

This report of a massive program of investigation carried out in West Africa provides basic data on epidemiology and control of malaria which may be a useful model for other work on insect-borne parasitic diseases. The project and the book may be viewed as good investments.—Edgar A. Steck, Silver Spring, MD.

ANNUAL REVIEW OF ENTOMOLOGY, Vol. 26, 1981. T. E. Mittler, F. J. Radovsky, and V. C. Resh, Editors. Annual Reviews, Inc. Palo Alto, CA 94306. $20.00.

This volume marks the beginning of the 2nd quarter-century of the *Annual Review of Entomology*, and in the Preface the Editorial Committee has presented some valuable comments on the characteristics of an effective review. There are 17 reviews 2 of which deal exclusively with mosquitoes.

In the "Biology of *Toxorhynchites*" (22 pages) W. A. Steffan and N. L. Evenhuis have summarized recently acquired knowledge of this interesting group of mosquitoes all of which are beneficial to man. Larval cannibalism is somewhat reduced because of a lengthy period of oviposition by females. Tree holes are favorite oviposition sites along with cut bamboo/cane and bromeliads. The predatory behavior of larvae is basically opportunistic. Prepupal compulsive killing has been noted in a number of species. Larval diapause of *Tx. rutilus septentrionalis* is controlled by photoperiod and temperature. Little is known about dispersal of adults. Suggestions are made pertaining to research which might facilitate the successful use of several species in biological control programs.

The 2nd review of prime interest to mosquito control workers consists of 24 pages and is entitled "Field Studies of Genetic Control Systems for Mosquitoes." The authors are S. M. Asman, P. T. McDonald, and T. Prout. There are 3 genetic control systems which have been intensively studied and employed in field trials although others have theoretical possibilities.

The 1st system is that of Sterile Male Release (SMR). It is aimed only at population suppression. The 2nd system involves incompatibility; incompatible males equate to sterile males. The 3rd system, translocations, has been the object of intensive research. The authors describe briefly how translocations produce sterility and discuss various aspects of SMR in relation to ecological problems. Theoretically translocations may also be used for population replacement.

In a section entitled "Necessary Components of a Successful Program" some emphasis is placed on the need for obtaining quantitative data on mosquito biology and ecology and for monitoring the characteristics of laboratory populations. Sterile males must be highly competitive with wild males.

The last major section called "Field Studies with Autocidal Control" reviews exploratory programs involving 8 mosquito species: *Anopheles albimanus* in El Salvador; *An. stephensi* and *An. culicifacies* in Pakistan; *Aedes aegypti* in India, Kenya, and Florida; *Ae. sierrensis* in

California; *Culex pipiens* in France; *Cx. quinquefasciatus* in India; *Cx. tritaeniorhynchus* in Pakistan; *Cx. tarsalis* in California. In these programs it has been demonstrated that mosquito populations can be suppressed, but additional research is needed to provide proof that operational costs for a genetic control project will compare favorably with costs for other means of control. This review certainly presents a thorough and interesting picture, and a non-specialist can find no "room for improvement."

In another article, "Insect Conservation" by R. Pyle, M. Bentzien, and P. Opler, the following statement occurs: "Certain scarce bog orchids require pollination by mosquitoes, among the most despised insects. Mosquitoes, too, along with other aquatic or riparian insects, constitute the major nourishment of many native fishes."—W. E. Bickley

Selected List of Abbreviations and Symbols

Used in *Mosquito News*

acre...spell out
about (*circa*)...ca.
active ingredient...AI
and others...et al.
average...avg
centimeter...cm
compare...cf.
cubic centimeter...cc
cubic foot...ft^3
cubic meter...m^3
cubic millimeter...mm^3
cubic yard...yd^3
diameter...diam
dosage mortality...DM
dozen...doz
emulsifiable concentrate...EC
feet per second...ft/sec
figure (illustration)...Fig.
fluid ounce...fl oz
foot or feet...ft
gallon...gal
gram...g
granules, granular...G
hectare...ha
hour...hr
inch...(spell out if it precedes in)...in.
kilogram...kg
kilometer...km
liter...spell out
meter...m
mile...mi.
miles per hour...mph
milligram...mg
milliliter...ml
minute...min
number...no.
ounce...oz
per (with numerals).../
percent...%
pound...lb
pounds per square inch...psi
quart...qt
relative humidity...RH
second...sec
significant at 1% level...**
significant at 5% level...*
square centimeter...cm^2
square inch...$in.^2$
square mile...$mi.^2$
square millimeter...mm^2
square yard...yd^2
ultra low volume...ULV
week...wk
yard...yd